FIG. 1A

PRIOR ART

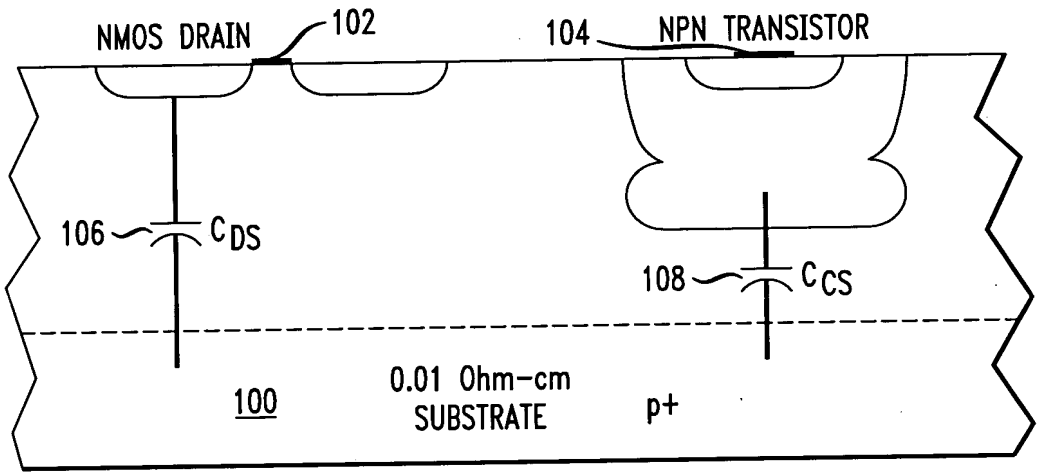


FIG. 1B

PRIOR ART

150

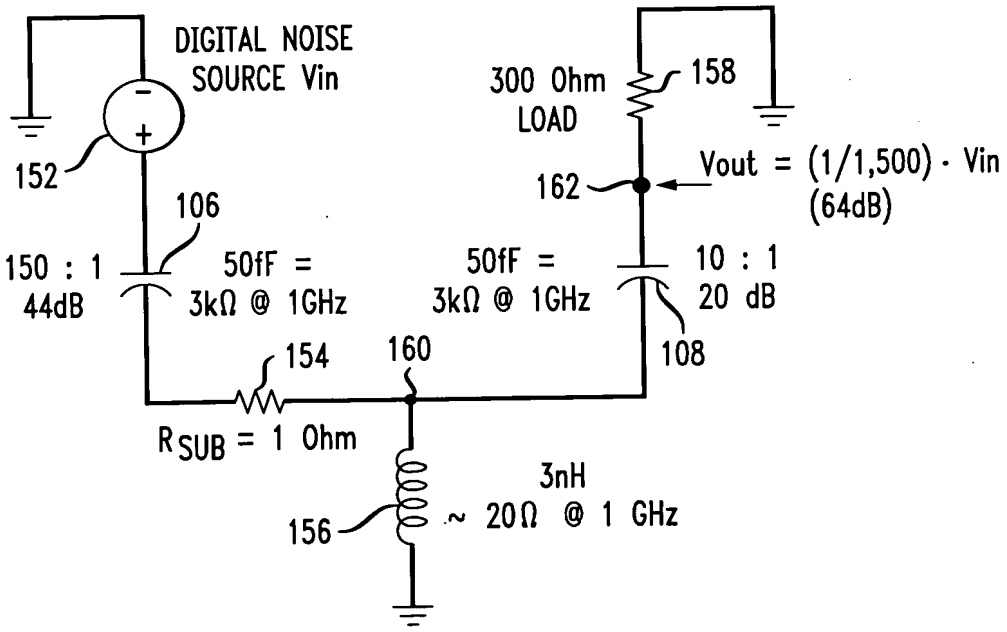


FIG. 2

PRIOR ART

200

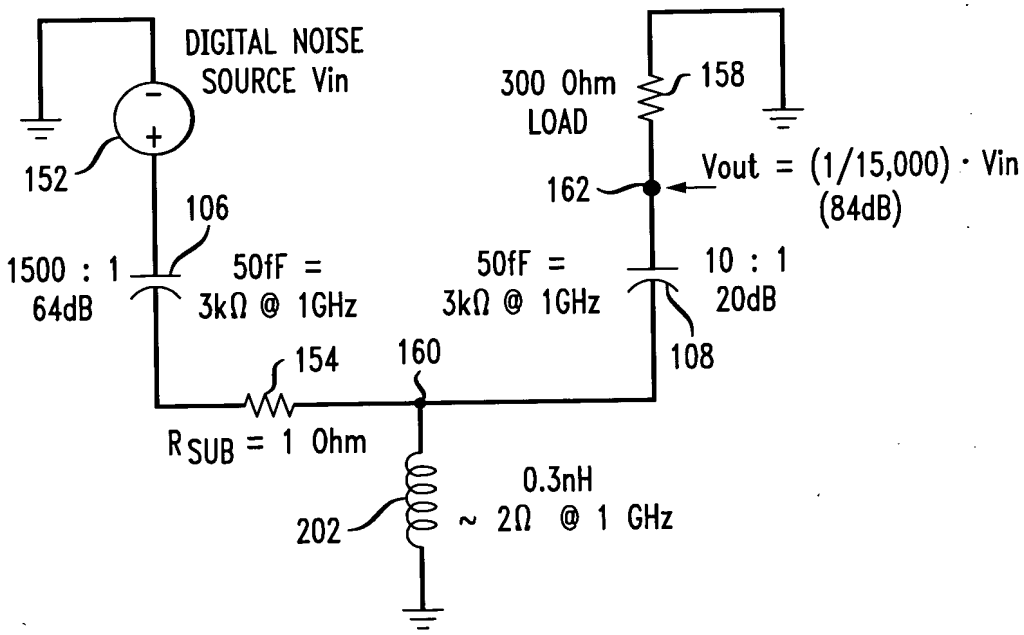


FIG. 3A

PRIOR ART

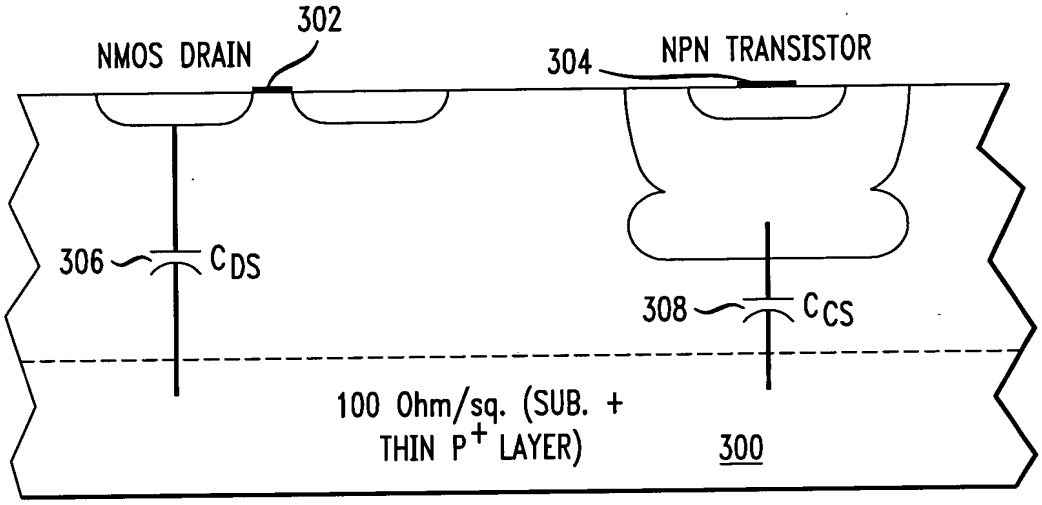


FIG. 3B

PRIOR ART

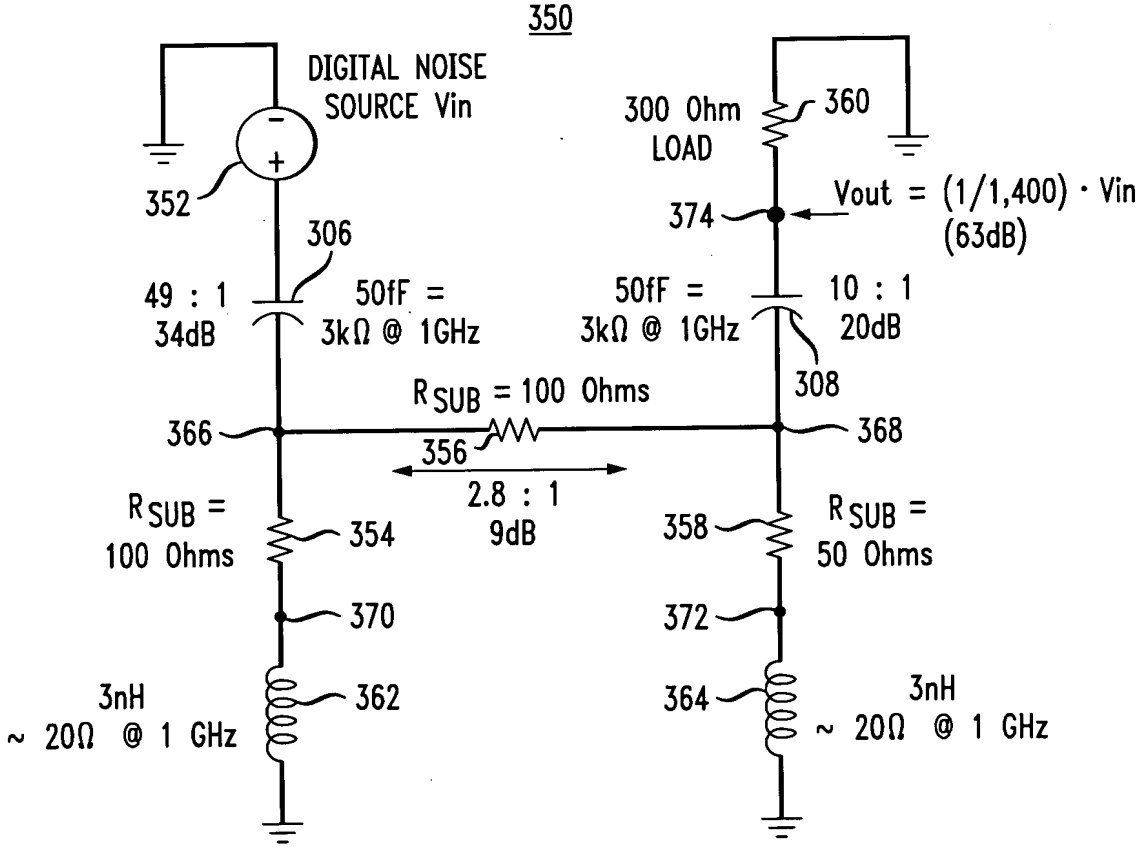


FIG. 4A

PRIOR ART

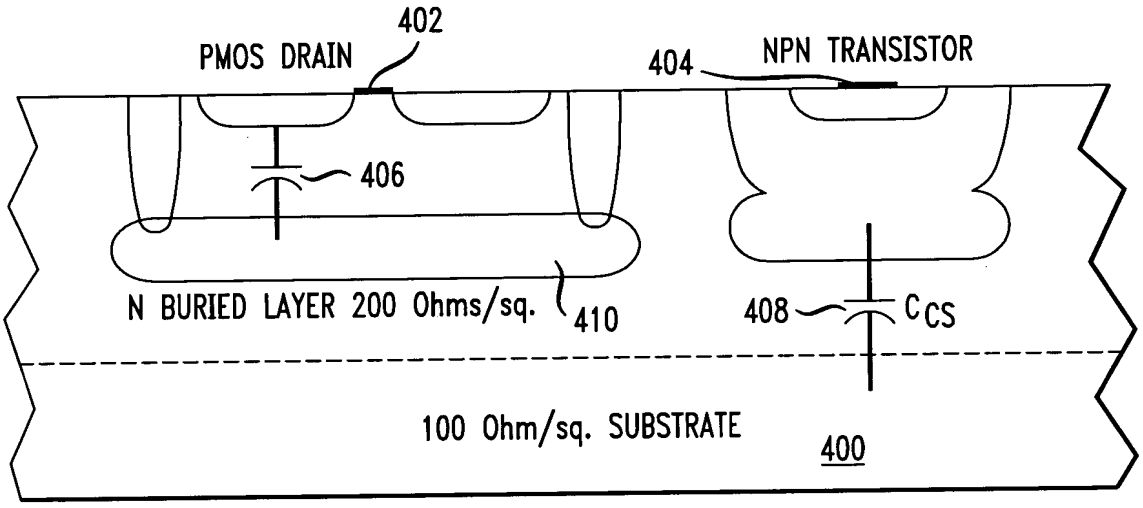


FIG. 4B

PRIOR ART

450

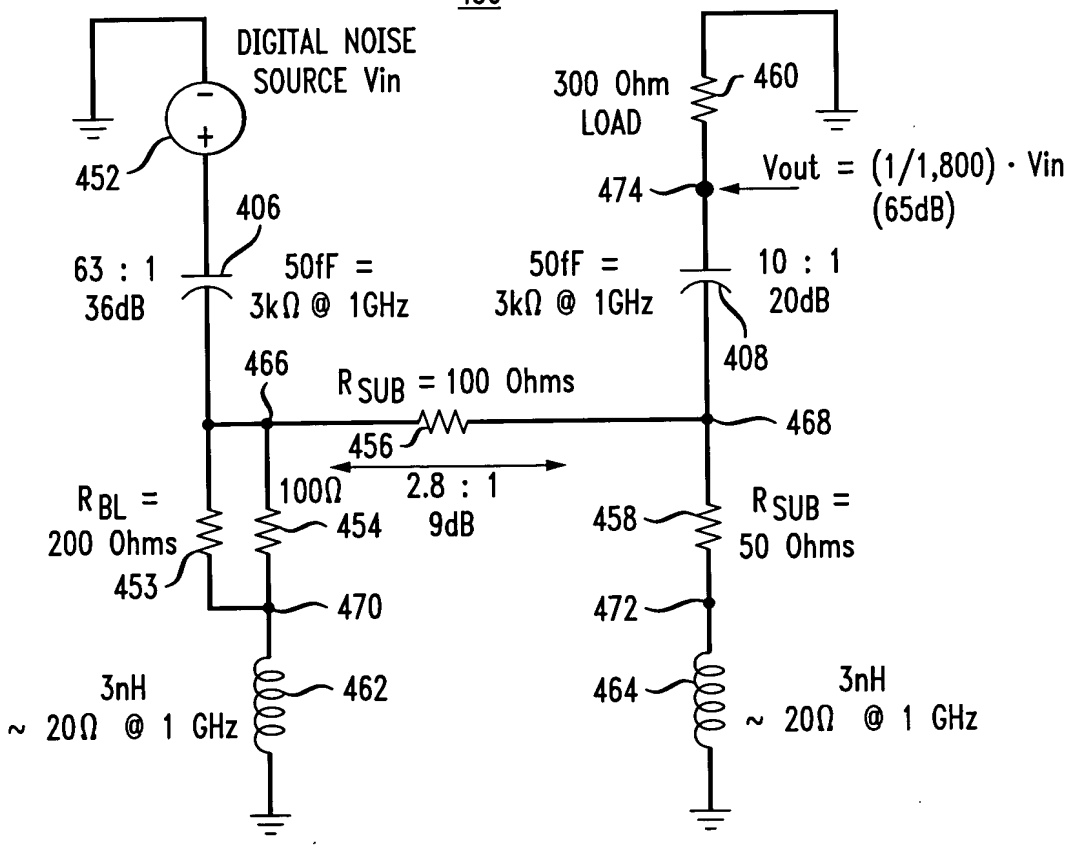


FIG. 5

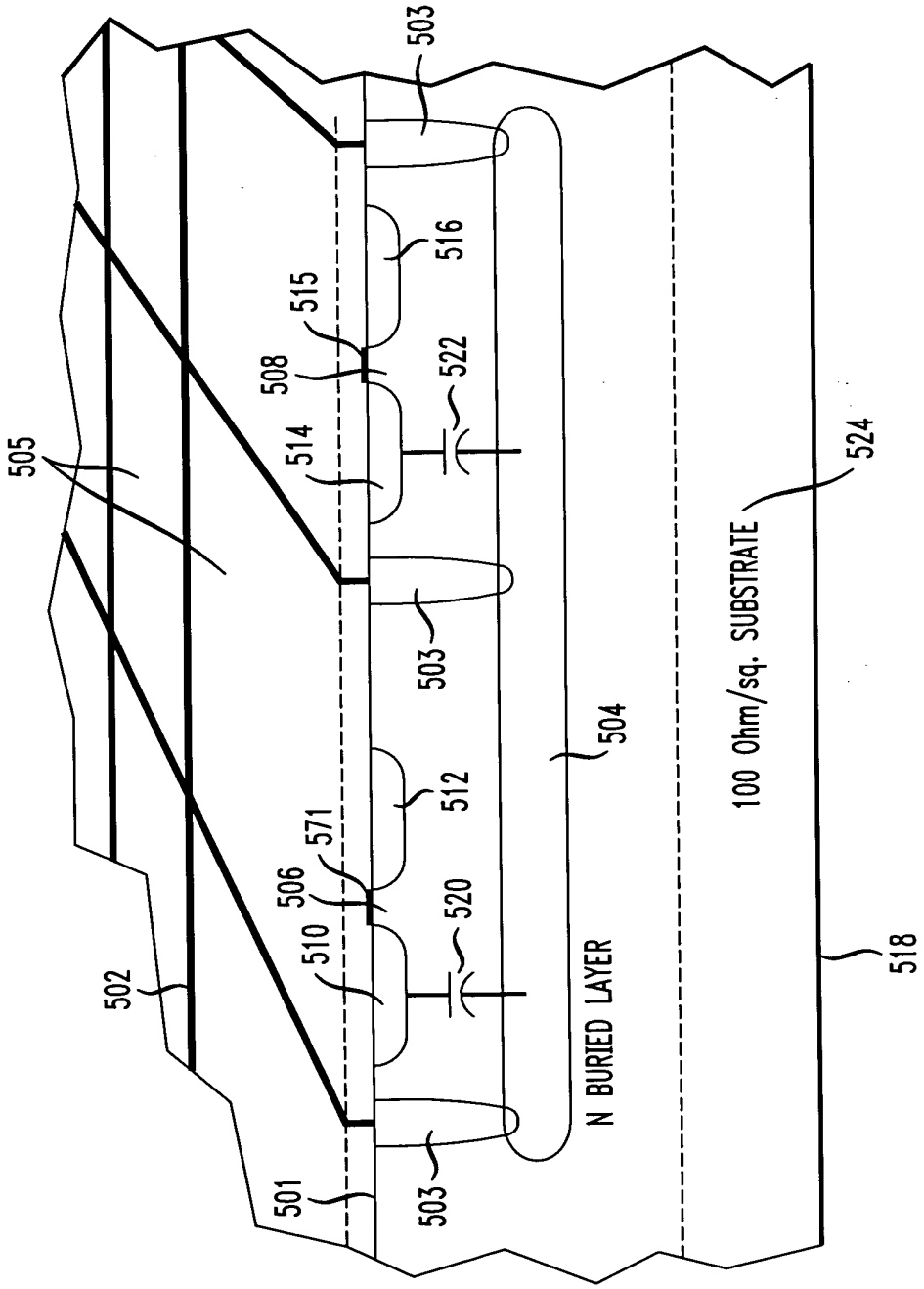

500
503
516
515
508
522
514
505
503
504
512
571
506
520
510
502
501
503
N BURIED LAYER
100 Ohm/sq. SUBSTRATE
524
518

FIG. 6A

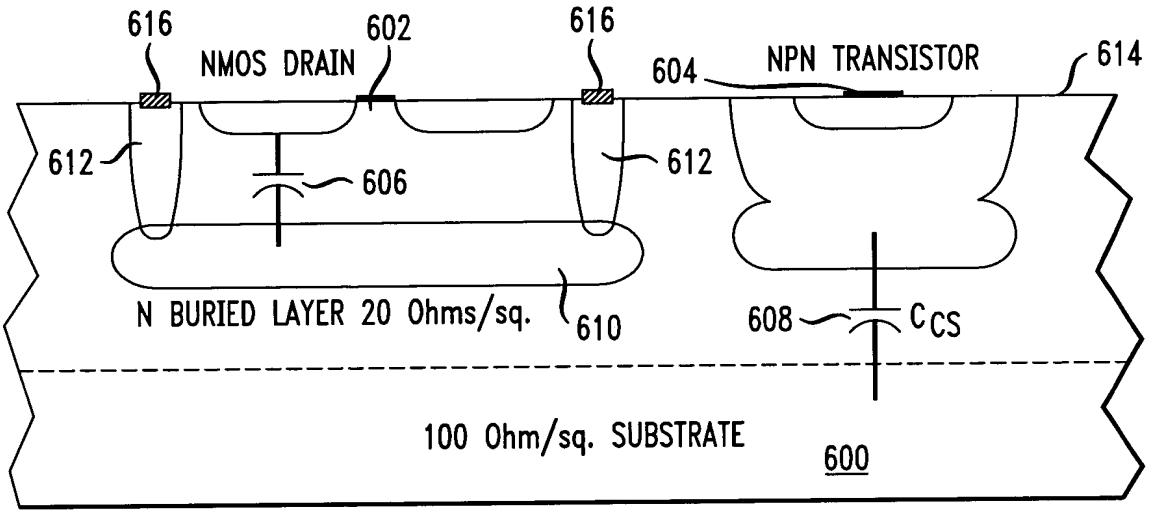

616
NMOS DRAIN
602
616
604
NPN TRANSISTOR
614
612
606
612
N BURIED LAYER 20 Ohms/sq.
610
608
CCS
100 Ohm/sq. SUBSTRATE
600

FIG. 6B

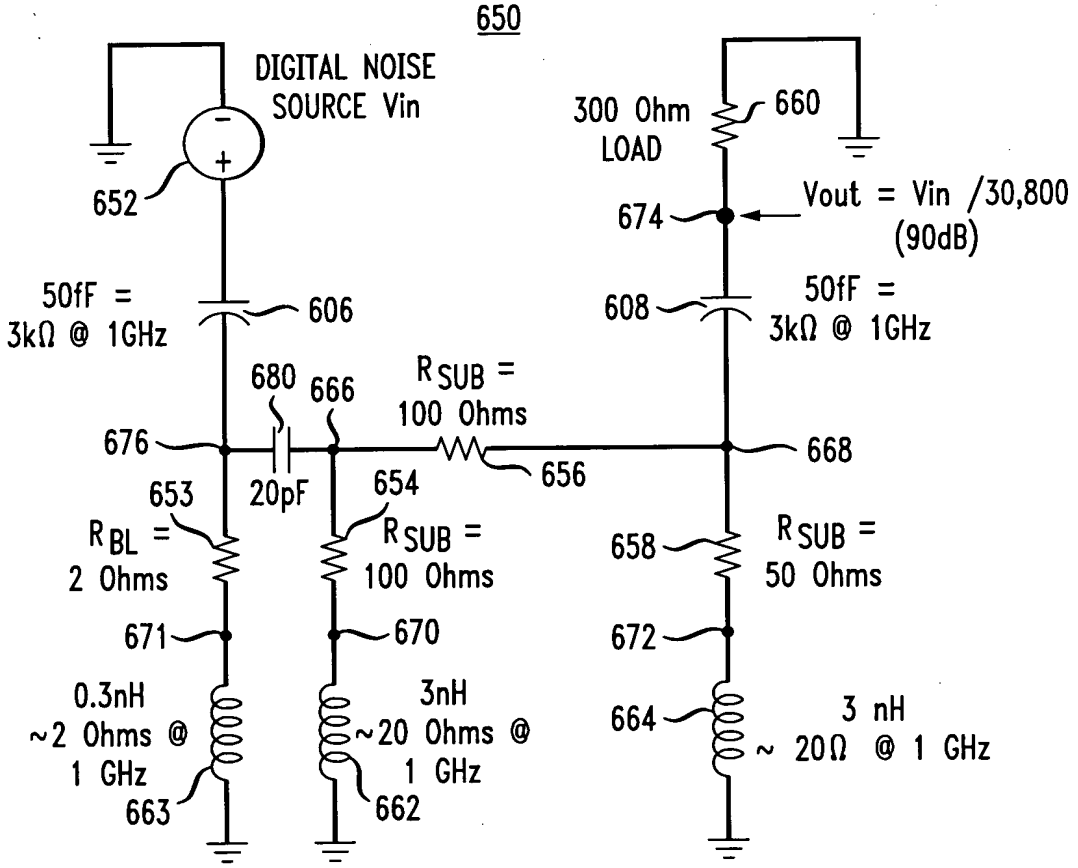

650
DIGITAL NOISE SOURCE Vin
652
50fF = 3kΩ @ 1GHz
606
680
666
RSUB = 100 Ohms
676
656
668
653
20pF
654
RBL = 2 Ohms
RSUB = 100 Ohms
671
670
0.3nH ~2 Ohms @ 1 GHz
663
3nH ~20 Ohms @ 1 GHz
662
300 Ohm LOAD
660
674
Vout = Vin /30,800 (90dB)
608
50fF = 3kΩ @ 1GHz
658
RSUB = 50 Ohms
672
664
3 nH ~ 20Ω @ 1 GHz

FIG. 7A

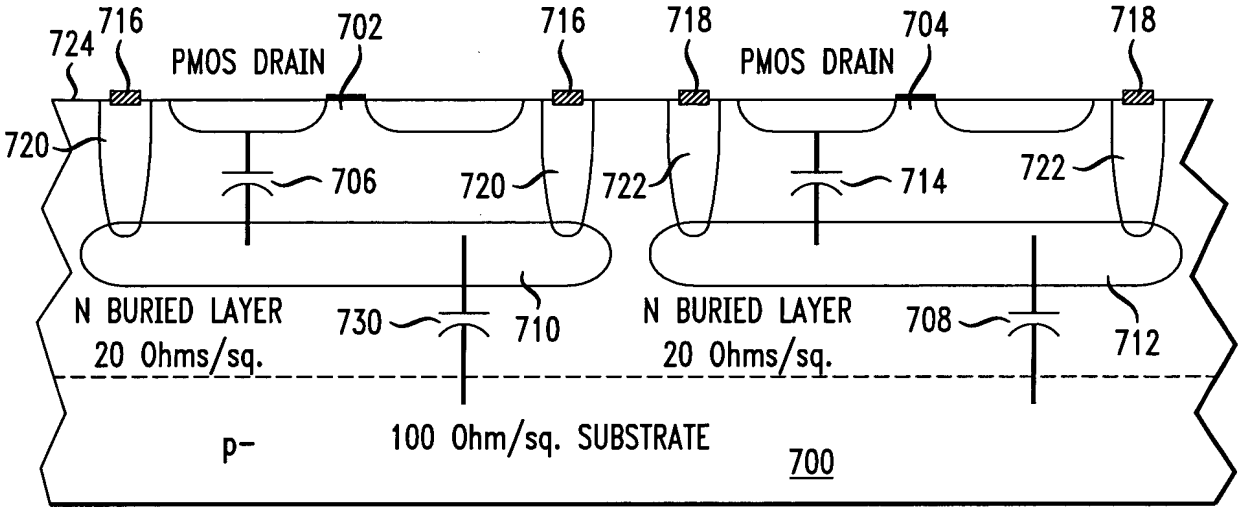
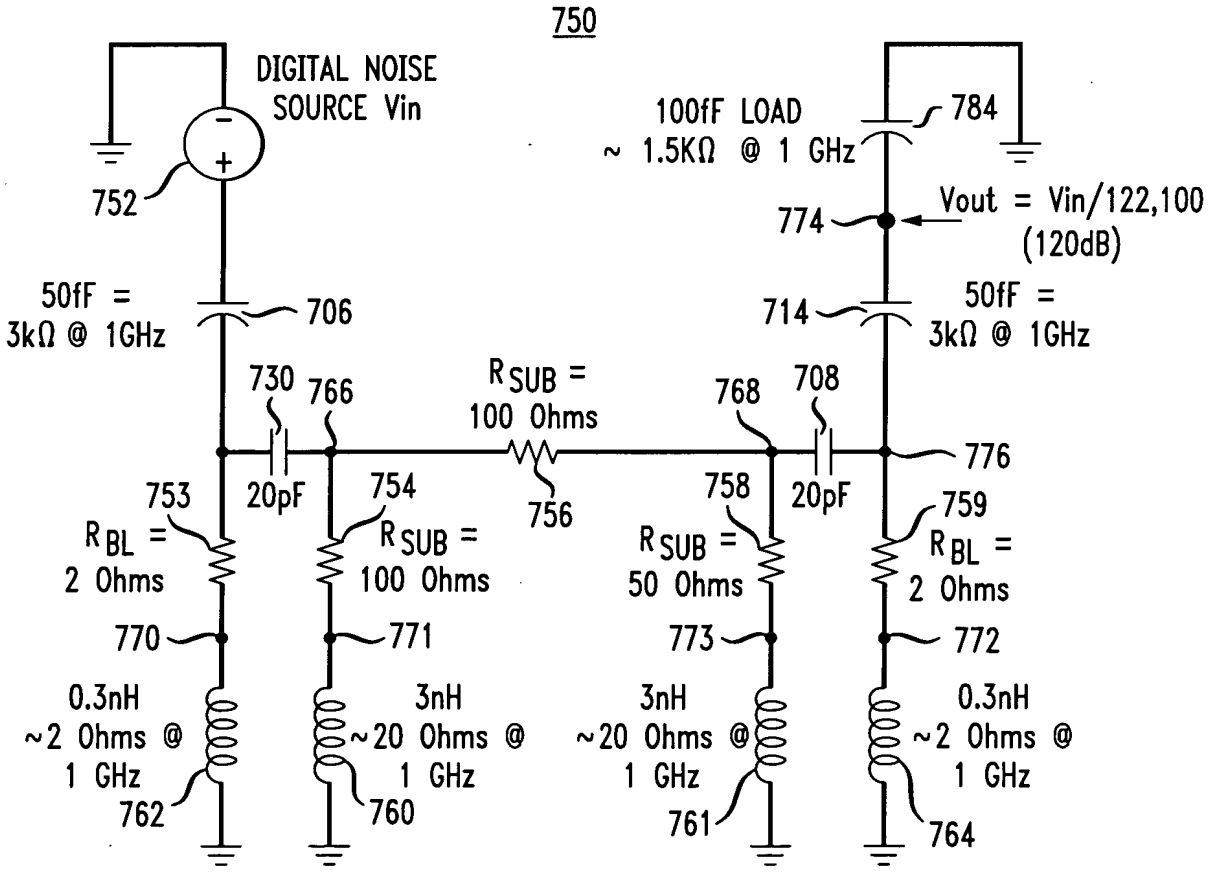

724
716
PMOS DRAIN
702
716
718
PMOS DRAIN
704
718
720
706
720
722
714
722
N BURIED LAYER
20 Ohms/sq.
730
710
N BURIED LAYER
20 Ohms/sq.
708
712
p-
100 Ohm/sq. SUBSTRATE
700

FIG. 7B


750
DIGITAL NOISE
SOURCE Vin
752
100fF LOAD
~ 1.5KΩ @ 1 GHz
784
774
Vout = Vin/122,100
(120dB)
50fF =
3kΩ @ 1GHz
706
714
50fF =
3kΩ @ 1GHz
730
766
R SUB =
100 Ohms
768
708
776
753
20pF
754
756
758
20pF
759
R BL =
2 Ohms
R SUB =
100 Ohms
R SUB =
50 Ohms
R BL =
2 Ohms
770
771
773
772
0.3nH
~2 Ohms @
1 GHz
762
3nH
~20 Ohms @
1 GHz
760
3nH
~20 Ohms @
1 GHz
761
0.3nH
~2 Ohms @
1 GHz
764